Claims

What is claimed is:

1. (Original) An object detection system, comprising:

A structured light source capable of projecting a first pattern of structured light from a small aperture, said first pattern of structured light falling within a thin planar volume of space:

A first electronic imager not co-planar with said first pattern of structured light, said imager arranged in a pre-determined spatial relationship to said aperture, and said imager imaging a region of space in which objects could intersect said first projected pattern of structured light;

Means for storing a plurality of electronic images; and

Means calculating object positions from the positions in which structured light appears in a plurality of images.

2. (Original) The object detection system of claim 1, further comprising means for performing dead reckoning, said dead reckoning means arranged in a pre-determined spatial relationship to said aperture.

3. (Original) The object detection system of claim 1, further comprising means for storing object map information about positions of detected objects.

4. (Original) The object detection system of claim 1, further comprising means for indicating an alarm

condition if objects enter a volume of space where objects should not be allowed.

5. (Original) The object detection system of claim 1, further comprising means for taking automated corrective action if objects enter a volume of space where objects should not be allowed.

6. (Original) An object detection method, comprising:

Projecting through a first small aperture a first structured light pattern within a first thin planar volume of space in which it is desired to measure the position of objects;

Capturing and storing at least one image from a first electronic imager positioned in a predetermined spatial relationship to said first small aperture;

Digitally processing at least one captured image to determine positions of objects intersecting said first structured light pattern.

7. (Original) The method of claim 6, wherein said step of capturing at least one electronic image comprises capturing a plurality of images and further comprising the step of moving said electronic imager relative to said objects between capturing at least two of said plurality of images, while maintaining the spatial relationship between said first electronic imager and said first optical aperture.

8. (Original) The method of claim 6, wherein said step of capturing at least one electronic image comprises

capturing a plurality of images, through a plurality of spatially substantially non-coincident electronic imagers.

9. (Original) The method of claim 6, wherein said step of capturing at least one electronic image comprises capturing a plurality of images through said first electronic imager, and wherein said step of digitally processing at least one captured image comprises processing a plurality of captured images in such a way as to improve signal-to-noise ratio, and spatial resolution.

10. (Original) The method of claim 6, wherein said step of capturing at least one electronic image comprises capturing a plurality of images through said first electronic imager, and varying the plane of said structured light pattern between capturing at least two of said plurality of images such that images are captured of objects intersecting a plurality of thin planer structured light patterns, and said step of digitally processing at least one captured image comprises processing a said plurality of images captured of intersections of objects with said plurality of varied-plane structured light patterns, to derive a three-dimensional representation of the intersection of objects with said plurality of planar structured light patterns.

11. (Original) The method of claim 7, further comprising combining dead-reckoning data with object position data from a plurality of electronic images captured from a plurality of positions of said electronic imager, to produce a three-dimensional representation of objects within a volume of interest.

12. (Original) The method of claim 10, further comprising combining dead-reckoning data with redundantly derived object position data from a plurality of electronic images captured from a plurality of positions of said electronic imager imaging intersections of objects with a plurality of planar structured light patterns, to produce a three-dimensional representation of objects within a volume of interest which has less position-dependent position error than a three-dimensional representation derived from a single position of said electronic imager.